CLAIMS:

1. An optical scanning device for scanning a first information layer by means of a first radiation beam having a first wavelength and a first polarization, a second information layer by means of a second radiation beam having a second wavelength and a second polarization, and a third information layer by means of a third radiation beam having a third wavelength and a third polarization, wherein said first, second and third wavelengths substantially differ from each other and at least one of said first, second and third polarizations differs from the others, the device comprising:

a radiation source for supplying said first, second and third radiation beams consecutively or simultaneously,

an objective lens system for converging said first, second and third radiation beams on the positions of said first, second and third information layers, respectively, and

a diffractive part arranged in the optical path of said first, second and third radiation beams, the part including a pattern of pattern elements which have substantially one stepped profile for forming a first diffracted radiation beam, a second diffracted radiation beam and a third diffracted radiation beam from said first, second and third radiation beams, respectively, the part comprising birefringent material sensitive to said first, second and third polarizations,

characterized in that said stepped profile is designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two different multiples of 2π for said first wavelength and at least two substantially different phase changes modulo 2π for said second wavelength.

2. An optical scanning device according to claim 1, wherein said stepped profile is further designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two substantially different phase changes modulo 2π for said third wavelength.

3. An optical scanning device according to claim 2, wherein said stepped profile is further designed such that the heights of the steps of a pattern element introduce

substantially identical phase changes for both said second and third wavelengths, wherein said third polarization differs from said second polarization.

4. An optical scanning device according to claim 3, wherein the extraordinary refractive index of said birefringent material substantially equals $1+\frac{\lambda_c}{\lambda_b}(n_o-1)$, where "$n_o$" is the ordinary refractive index of said birefringent material and "λ_b" and "λ_c" are either said second and third wavelengths, respectively, or said third and second wavelengths, respectively.

5. An optical scanning device according to claim 1, wherein said stepped profile is designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two different multiples of 2π for said third wavelength.

6. An optical scanning device according to claim 5, wherein said stepped profile is further designed such that the heights of the steps of a pattern element introduce substantially identical phase changes for both said first and third wavelengths, wherein said third polarization differs from said first polarization.

7. An optical scanning device according to claim 6, wherein the extraordinary refractive index of said birefringent material substantially equals $1+\frac{\lambda_c}{\lambda_b}(n_o-1)$, where "$n_o$" is the ordinary refractive index of said birefringent material and "λ_b" and "λ_c" are either said first and third wavelengths, respectively, or said third and first wavelengths, respectively.

8. An optical scanning device according to claim 1, wherein said stepped profile is designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two different odd multiples of π for said third wavelength.

9. An optical scanning device according to claim 8, wherein said stepped profile is designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two of an odd number of substantially different phase changes for said second wavelength.

10. An optical scanning device according to claim 1, wherein said pattern element is designed such that the relative step heights between adjacent steps of said pattern element include a relative step height having an optical path substantially equal to $a\lambda_1$, wherein a is an integer and $a>1$ and λ_1 is said first wavelength.

11. An optical scanning device according to claim 1, wherein the shape of said diffractive part is generally circular and the steps of said pattern element are generally annular.

12. An optical scanning device according to claim 1, wherein said diffractive part is formed on a face of a lens of the objective lens system.

13. An optical scanning device to claim 1, wherein said diffractive part is formed on an optical plate provided between said radiation source and said objective lens system.

14. An optical scanning device according to claim 13, wherein said optical plate comprises a quarter wavelength plate or a beam splitter.

15. A diffractive part for use in an optical device for scanning a first information layer by means of a first radiation beam having a first wavelength and a first polarization, a second information layer by means of a second radiation beam having a second wavelength and a second polarization, and a third information layer by means of a third radiation beam having a third wavelength and a third polarization, wherein said first, second and third wavelengths substantially differ from each other and at least one of said first, second and third polarizations differs from the others, the diffractive part:

being arranged in the optical path of said first, second and third radiation beams,

including a pattern of pattern elements which have substantially one stepped profile for forming a first diffracted radiation beam, a second diffracted radiation beam and a third diffracted radiation beam from said first, second and third radiation beams, respectively, and

comprising birefringent material sensitive to said first, second and third polarizations,

characterized in that said stepped profile is designed such that the heights of the steps of a pattern element introduce phase changes that substantially equal at least two different multiples of 2π for said first wavelength, at least two substantially different phase changes modulo 2π for said second wavelength and, for said third wavelength, one of the following: at least two substantially different phase changes modulo 2π, at least two different multiples of 2π, or at least two different odd multiples of π.

16. A lens for use in an optical device for scanning a first information layer by means of a first radiation beam having a first wavelength and a first polarization, a second information layer by means of a second radiation beam having a second wavelength and a second polarization, and a third information layer by means of a third radiation beam having a third wavelength and a third polarization, wherein said first, second and third wavelengths substantially differ from each other and at least one of said first, second and third polarizations differs from the others, the lens being provided with a diffractive part according to claim 15.